PURWANCHAL UNIVERSITY
VII SEMESTER FINAL EXAMINATION-2006

LEVEL : B. E. (Computer)
SUBJECT: BEG75CO, Mobile Communication.
Full Marks: 80
TIME: 03:00 hrs **Pass marks:** 32

Candidates are required to give their answers in their own words as far as practicable.
The marks allotted for each sub-questions is specified along its side.

GROUP-A: LONG-ANSWER TYPE QUESTIONS

Attempt any TWO questions. [2×12=24]

Q. [1] Describe the history and future trend of wireless communication.
Q. [2] What are the cellular concepts and cellular system fundamental. Explain.
Q. [3] Enumerate the latest advancement in mobile communication.

GROUP-B: SHORT-ANSWER TYPE QUESTIONS

Attempt any SEVEN questions. [7×8=56]

Q. [4] What is trunkip theory? Why is the cell splitting and settoning used?
Q. [5] Differentiate between large scale path and small scale path loss.
Q. [6] What are analog modulation schemes for wireless communication?
Q. [7] Discuss the main advantages of multipath propagation.
Q. [8] Give a brief description of diversity and its types.
Q. [9] Elaborate an digital modulation techniques for wireless Communication.
Q. [10] Describe handling strategies and explain its application in 2nd Generation systems.
Q. [11] What is the need of fix and dynamic assignment and channel Assignment strategies?
Q. [12] Write short notes on:
[a] FDMA **[b]** TDMA **[c]** CDMA **[d]** ISI

PURWANCHAL UNIVERSITY

VII SEMESTER FINAL EXAMINATION-2006

LEVEL : B. E. (Electronics & communication)
SUBJECT: BEG432EC, Wireless and Mobile Communication.
Full Marks: 80
TIME: 03:00 hrs **Pass marks:** 32

Candidates are required to give their answers in their own words as far as practicable.

The figure in the margin indicates full marks.

Attempt ALL questions.

Q. [1] [a] What is co-channel interference? What are the methods to improve capacity in cellular system? Explain any two in brief. [2+6]

[b] If S/I = 15 dB is required for satisfactory forward channel performance of a cellular system, What is the frequency reuse factor and cluster size that should be used for maximum capacity if path loss exponent is (a) n=4 (b) n = 3? Assume there are six co-channel cells in the first tier and all of them are at same distance form the mobile. [8]

Q. [2] [a] Define path loss. How would you explain the reflection and scattering mechanism in mobile radio propagation? [2+3+3]

[b] A transmitter produces a 36 watt of power. What will be the transmitted power in (a) dBm (b) dBW.?If the carrier frequency is 2.4 GHz, find the received power at a distance of 1 km. Assume transmitter and receiver antenna gains to be 1.5 each. Also find the received power at distance of 10km. [1+1+3+3]

Q. [3] [a] Why do you think multiple access techaniques is important? Explain TDMA and FHMA in brief. [2+3+3]

[b] What are the different factors that influence the choice of digital modulation? Show that the probability of bit error for BPSK and QPSK are same with the help of constellation diagram. [5+3]

Q. [4] [a] List the out the services that are provided in GSM. Explain GSM system architecture along with figure. **[2+6]**

[b] Explain forward CDMA channel with figure. [8]

Q. [5] [a] What is the total numers of users that can be supported for a blocked calls cleared system operating with 30 channels at 2% blocking? Assume that the holding item is 90 Sec and call arrival rate is one per hour. [8]

[b] Write in brief about (any TWO):

[a] Interleaving.
[b] Near far problem.
[c] GPRS
[d] GSM and IS-95 specifications.

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VII SEMESTER FINAL EXAMINATION-2007

LEVEL : B. E. (Electronics & communication)
SUBJECT: BEG432EC, Wireless and Mobile Communication.
Full Marks: 80
TIME: 03:00 hrs **Pass marks:** 32

Candidates are required to give their answers in their own words as far as practicable.

The marks allotted for each sub-question is specified along its side.

Attempt FIVE questions.

Q. [1] [a] How cellular mobile communication is evolved? Explain with 3 examples of each Generation. [8]

[a] How co-channel cells are assigned? Elaborate. [8]

Q. [2] A wireless system operating at 800Mhz band with a transmit power of 230mW, the transmitter and receiver antenna gain is 10dBi operating at a distance of 25KM. Justify and comment on the system operability with the receiver sensitivity of 88-dBm. The height of the BTS is 50m and the height of mobile station is 10m. Assume Hata model for suburban area. [16]

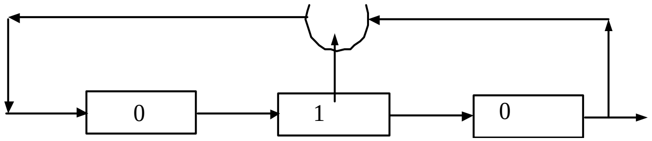
Q. [3] [a] Explain QPSK modulation techniques with mathematical model and constellation diagram. [8]

[b] Prove mathematically that the MKS provides: frequency deviation equals the half the bit rate. [8]

Q. [4] [a] If S/I ratio of 16 dB is-required for satisfactory operation of a wireless system, what is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is (a) 4 (b) n= 3. Assume that there are six co-channel cells in the first tier and all of them are at the same distance from the mobile. Use suitable approximation. [10]

[b] Differentiate between TDMA and FDMA? [6]

Q. [5] [a] Modulo 2 adder.



Generate output of the shift register.

[b] Explain the principle of operation of Rake receiver. [6]

Q.[6] [a] With neat diagram, explain the network architecture of GSM system. [8]

[b] Write the technical specification of IS-95. [8]

PURWANCHAL UNIVERSITY
VII SEMESTER FINAL EXAMINATION-2007

LEVEL : B. E. (Computer)
SUBJECT: BEG75CO, Wireless and Mobile Communication.(elective)
Full Marks: 80
TIME: 03:00 hrs **Pass marks:** 32

Candidates are required to give their answers in their own words as far as practicable.

The marks allotted for each sub-question is specified along its side.

Attempt ALL questions.

Q. [1] **[a]** Explain with the help of timing diagram a call establishment form mobile to PSTN. [5]

[a] What are the specific upgraded features of mobile form 1G to 4G? [10]

Q. [2] **[a]** Any city has area of 1200 sq.km and is covered by a cellular system using 7 cell reuse pattern. Each hexagonal cell has radius of 4km and the city is provided with 40 MHz of spectrum with half duplex channel bandwidth of 60KHz. Assuming GOS of 2% for an Erlang B system compute: [8]

[i] Number of cells in service area.
[ii] Number of channel per cell.
[iii] Traffic intensity of each cell.
[iv] Maximum carried traffic.
Given: Area of hexagonal cell = $2.5981R^2$

[b] What are the types of system generated cellular interference and its remedies in wireless and mobile communication system? [7]

Q. [3] **[a]** What are the factors influencing small scale fading? List and define parameters quantifying the multipath channel. [8]

[b] Explain the practical pulse shaping technique. [7]

Q. [4] **[a]** What is duplexing? What are the types of duplexing used in mobile Communication system? [6]

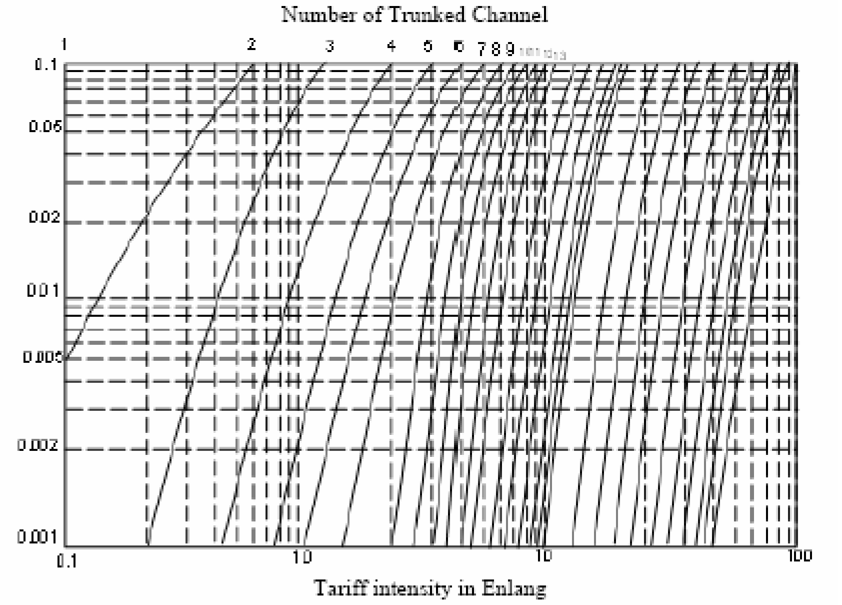
[b] What is the advantage of multiple access schemes? Explain in detail frequency hopped multiple access. [6]

Q. [5] **[a]** Draw the GSM architecture and explain its components along with interfaces. [12]

[b] Explain the principle used in CDMA. [3]

Q. [6] Write short notes on any TWO: [3]

[a] WLL
[b] GMSK
[c] CDMA2000.



The Erlang B chart showing the probability of blocking as functions of the number of channels and traffic intensity in Erlangs.

PURWANCHAL UNIVERSITY
VII SEMESTER FINAL EXAMINATION-2008

LEVEL : B. E. (Electronics & communication)
SUBJECT: BEG432EC, Wireless and Mobile Communication.
Full Marks: 80
TIME: 03:00 hrs **Pass marks:** 32

Candidates are required to give their answers in their own words as far as practicable.

The figure in the margin indicates full marks. .

GROUP-A

Attempt TWO questions. **[2×14=28]**

Q. [1] [a] Derive path loss equation using free space propagation model.

[b] A transmitter with unity gain antenna produces 50 watt of power at 900 Mhz. carries frequency, find received power in dBm at a free space distance of 100m from the antenna. Assume unity gain receiver antenna.

Q. [2] [a] What are MSK and GMSK modulation techniques? Draw the block diagram of an MSK modulator.

[b] Find 3dB bandwidth for a Gaussian low pass filter used to produce 0.25 GMSK with a channel data rate of Rb=270 kbps.

Q. [3] [a] Why is CDMA called spread spectrum technology? Write the major benefits of CDMA over FDMA and TDMA.

[b] Explain in brief the hand-off strategies used in cellular communication systems.

BROUP-B

Answer FIVE questions. **[5×8=40]**

Q. [4] Why is hexagonal cell geometry chosen in cellular design?

Q. [5] What are different diversity techniques used in wireless communication? Explain one of them in brief.

Q. [6] What is LFSR? Derive a PN code with sequence length 7 using LFSR. Take initial state as 100.

Q. [7] What are different channel types in GSM?

Q. [9] Explain the working principle of a RAKE receiver.

Q. [10] Describe near-far problem in CDMA systems.

GROUP-C

Write short notes on any THREE: **[3×4=12]**

Q. 11. Cordless Systems.

Q. 12. Effective Isotropic Radiated power.

Q. 13. Small-scale fading

Q. 14. 4G-concept of wireless communication.

Q. 15. Frequency Hopping Spread Spectrum(FHSS).

PURWANCHAL UNIVERSITY
VII SEMESTER PACK-PAPER EXAMINATION-2008

LEVEL : B. E. (Electronics & communication)
SUBJECT: BEG475CO/BEG432EC, Mobile Communication.
Full Marks: 80
TIME: 03:00 hrs **Pass marks:** 32

Candidates are required to give their answers in their own words as far as practicable.
The marks allotted for each sub-questions is specified along its side. .

Answer EIGHT questions.

Q. [1] [a] Explain the role of Base Transreceiver Substaion (BTS) and Mobile Switching Centre.(MSC). [5]
[b] Specify the difference between 1G, 2G, 2.5G, 3G. [5]

Q. [2] [a] Explain early mobile radio Vs. the cellular concept. [5]
[b] Explain the basic concept of frequency reuse techniques problem of clustering, total capacity of a system & frequency reuse. [5]

Q. [3] [a] What are the channel assignment strategies? [5]
[b] Why adjacent-channel interference is caused, what are the sources? [5]

Q. [4] [a] What is the different between large scale & small scare path loss. [5]
[b] What is diffraction? Why an unobstructed line of sight path may still have diffraction loss? [5]

Q. [5] [a] what are the factors affecting in the choice of digital modulation? [5]
[b] explain the performance advantages of digital modulation over analog. [5]

Q. [6] [a] why diversity helps in multipath fading environments?[5]
[b] Why & how interleaving is used? [5]

Q. [7] [a] How FDMA, TDMA & CDMS work? [5]
[b] Write short notes on GSM, SDMA & IS-95. [5]

Q. [8] [a] Which of the following is NOT always an advantage of digital modulation over analog. [1]
[i] Ability to adopt to fading environment.
[ii] Better security.
[iii] Better signal quality.
[iv] Ability to support data traffic.

[b] A RAKE receiver is always used in conjunction with which modulation scheme. [1]
[i] Spread spectrum modulation.
[ii] Quadrature phase shift keying.
[iii] Frequency shif keying.
[iv] Quadrature amplitude modulation.

[c] The processing gain of a direct sequence spectrum system relates to what performance characteristics? [1]
[i] Signal to noise ratio.
[ii] Power efficiency.
[iii] Signal bandwith spread.
[iv] Bandwidth efficiency.

[d] Which is NOT major difficulty in implementing applications in wireless environments? [1]
[i] Limited device display capabilities.
[ii] Limited device power capabilities.
[iii] Adaptability of current internet protocols.
[iv] Lack of standards to support wireless applications.

[e] Given the following statements about 1st , 2nd, & 3rd generation cellular systems. [1]
[i] GSM uses a combination of TDMA & FDMA.
[ii] GSM is backwards compatible with AMPS.
[iii] The main differene between 1st & 3rd generation cellular sytem is a convention from analog to digital signals.
[a] I & II are true.
[b] II &III are true.
[c] Only I is true.
[d] All are false.

PURWANCHAL UNIVERSITY
2009
B. E. (Electronics & communication)/Seventh Semester/Chance
TIME: 03:00 hrs Full Marks: 80/ Pass marks:32
BEG475CO/BEG432EC, Mobile Communication (Elective-I)

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicates full marks.

Group A

Answer TWO questions. **4×14=28**

Q. [1] [a] Describe cellular concept in mobile communication system with necessary diagrams
[b] Explain channel assignment strategies in GSM.

Q. [2] [a] Illustrate free space propagation model in brief. Derive Frii's free space equation.
[b] Find the far-filed distance for an antenna with maximum dimension of 1m and operating frequency of 900 MHz.

Q. [3] [a] Explain Quadrature Phase Shift Keying (QPSK) modulator with block diagram.
[b] If the SNR of a wireless communication link is 20dB and the RF bandwidth is 30 KHz, determine the maximum theroretical data rate that can be transmitted.

Group B

Answer FIVE questions.

Q. [4] Calculate the reduction in transmit power (in dB) of micro-cells obtained by reducing the radius of a macro-cell by half. Take path loss exponent n = 4.

Q. [5] Explain different techniques used to improve converage and capacity of a cellular network.

Q. [6] Explain GSM system architecture in brief with diagram.

Q. [7] Explain log-distance path loss model in brief. What is log-normal shadowing?

Q. [8] What is equalization? Explain an adaptive equalizer in brief with diagram.

Q [9] Enumerate the various differences between frequency modulation and Amplitude Modulation.

Q. [10] What are the various interferences encountered in cellular communication system? Explain each of them in brief.

Group-C

Write short notes on any THREE. **3×4=12**

11. Paging system.
12. Fading in mobile environment.
13. Binary Phase Shift keying (BPSK).
14. Direct Sequencing Spread Spectrum (DSSS).